FIRST NORTH AMERICAN HOST RECORD OF THE ADVENTIVE WASP, CHRYSIS FUSCIPENNIS BRULLE

(Hymenoptera: Chrysididae)

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While making investigations on the parasites and associates of *Osmia clarescens* Cockerell (Megachilidae: Apoidea) utilizing empty mud nests of *Sceliphron caementarium* (Drury), a number of cells containing larvae of a chrysidid wasp were discovered. The adults which emerged in the laboratory were subsequently identified with the kind assistance of Karl V. Krombein as *Chrysis (Chrysis) fuscipennis* Brullé. This adventive wasp was first recorded in North America by Krombein (1956) when three females and one male were collected in Washington, D.C. Its Old World distribution encompasses the regions of Indo-Malaya, Syria, Palestine, Egypt, Asia Minor, China and Australia (Bingham, 1903, p. 468). The only other record from this continent concerns a single female taken in a house at Galt, Sacramento County, California (Harper, 1959).

The *Sceliphron* nests which contained the chrysidids were collected January 31, 1959, from under the roof, eaves, and along the upper walls in several old buildings at a ranch two miles northwest of Turlock, Stanislaus County, California. It was then noted that perhaps a dozen of the closed mud cells had a single conical puncture (about 1.5–2 mm. in diameter at the surface, narrowing to about .5 mm. internally) near the middle of the exposed side. Internal examination of the cells in the laboratory showed a one hundred per cent correlation between the presence of the chrysidid parasitoid and the punctures on the outside of the cells. A brown plug could be seen sealing the constricted inner third of the puncture and extending internally over the cell wall to form a thin circular convex flange about two millimeters in diameter. It appears to be formed from a dried liquid (probably of secretory origin) placed there upon withdrawal of the chrysidid's long ovipositor.

The relationship between *Sceliphron* and *Chalybion californicum* (Saussure) has long been known, and the cells taken over by *Chalybion* can in all cases be recognized on close examination (Rau, 1928, pp. 443–444). In the parasitized cells the original mud cap was apparently undisturbed, which would not

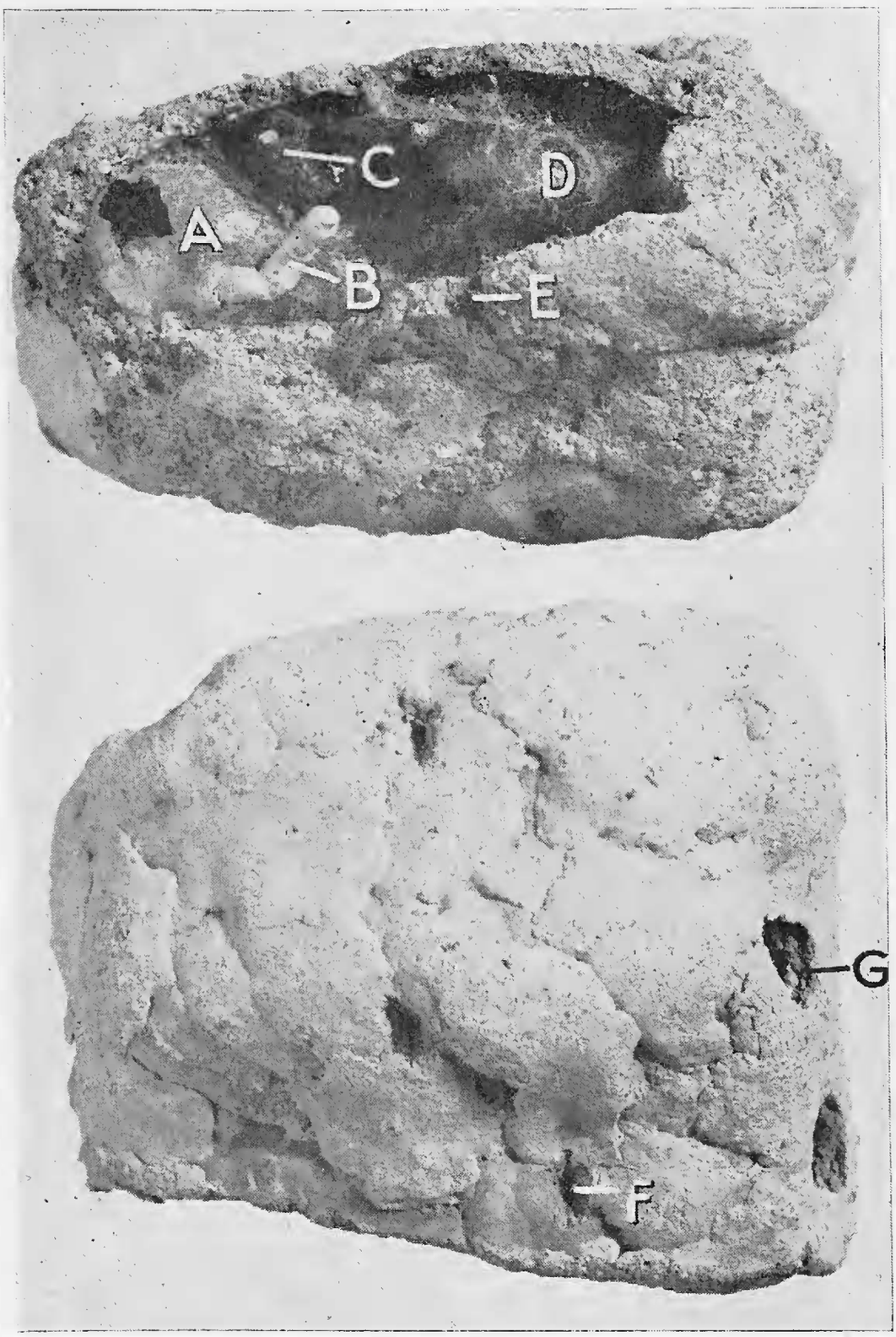
be the case if the cells had been previously appropriated by *Chalybion*. In a high percentage of cases, however, the unparasitized cells from the same locality yielded *Chalybion*, but this does not necessarily indicate that this wasp is not parasitized by the chrysidid.

In the parasitized cells the only host remains were the specialized meconial portion (*i.e.*, the chuck and chuck chamber of Shafer, 1949, pp. 30–31), and the anterior portion of the cocoon. Using the criteria set forth by Rau (1915), it was determined that all the identifiable cocoons were those of *Sceliphron*, thereby confirming the conclusion formed on the basis of the condition of the cell caps.

When first examined, the chrysidid larvae were mature and had already constructed cocoons. These pale yellow, parchment-like, semi-transparent cocoons were constructed of fine silk, and conformed closely to the lower third or fourth of the mud cells. In two instances the sphecid chuck chambers were in their normal position in the lower end of the cell with the chrysidid cocoon formed closely in contact above. In the remaining examples, the chuck chamber had been moved from its normal position and was variously placed near the center of the cell with the chrysidid cocoon then constructed below it. The creamy white meconium of the chrysidid was placed on the exposed top of the cocoon. It was extremely variable in shape, ranging from botuliform to globular. The nearly intact top half of the sphecid cocoon filled the top of the cell.

The cocoons were kept in the laboratory at room temperature, and the chrysidids (nine males and one female) emerged between April 6 and May 5, 1959. The sphecids, kept under the same conditions, all emerged between April 5 and April 23, 1959. All but two of the cells containing chrysidids were opened for observation in January. The parasitoids from these remaining two emerged through holes chewed through the mud caps at the top of the cells. All the chrysidid larvae, except those removed for preservation, successfully completed their development.

It seems apparent from these observations that *Chrysis fuscipennis* Brullé is a parasitoid on *Sceliphron caementarium* (Drury), attacking the mature larvae overwintering within their cocoons. Oviposition is accomplished by making punctures in the mud walls of the sphecid cells, which are then sealed upon withdrawal



Explanation of Figure

Nests of *Sceliphron caementarium* (Drury) parasitized by *Chrysis fuscipennis* Brullé. A. *Chrysis* cocoon. B. *Chrysis* meconium. C. *Sceliphron* chuck chamber. D. Remains of *Sceliphron* cocoon. E. Oviposition punctures of chrysidid (x-section). F. Oviposition punctures of chrysidid (external view). G. *Chrysis* emergence holes.

of the ovipositor. The chrysidid overwinters as a larva and emerges in the spring by chewing through the mud cap on the cell.

One of the previous Old World host records for *Chrysis fuscipennis* concerns a vespid, *Eumenes conica* (Fabricius), in India (Bingham, 1899). In this case the chrysidid gained access to the cell through the unsealed entrance in a brief absence of the provisioning vespid. Bingham's later examination of the nest showed two different semi-transparent eggs, the larger stuck on the cell wall while the other was on the single provisioned caterpillar. Bingham (1903, p. 468) also cites *Eumenes petiolata* Fabricius and *E. flavopicta* Blanch as hosts of this parasitoid in India.

It may be of interest to note that at this same Turlock ranch a determined effort was made to collect every *Sceliphron* nest that could be located in September of 1956. No evidence of *C. fuscipennis* was apparent at that time upon careful examination of all the approximately one hundred and fifty cells obtained. Also the author and Roy R. Snelling had collected Aculeate Hymenoptera intensively in the general Turlock area during the preceeding five years (occasionally examining *Sceliphron* nests) without ever turning up this species of parasitoid. This may indicate that the advent of the chrysidid into the Turlock area occurred after 1956.

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Literature Cited

Bingham, C. T.

1899. No. XIX.—Note on Eumenes conica, Fabr., and Megachile disjuncta, Fabr., and their parasites Chrysis fuscipennis, Brullé, and Parevaspis abdominalis, Smith. Jour. Bombay Nat. Hist. Soc., 12:585–587.

1903. The fauna of British India. Hymenoptera,—Vol. II. Taylor and Francis, London. pp. 1–506, pl.

Harper, R. W.

1959. 39th Annual Report of the Bureau of Entomology — 1958. Calif. Dept. Agri. Mo. Bull., 48(2):126.

Krombein, K. V.

1956. Chrysis fuscipennis Br., a recent adventive wasp in Washington, D. C. from the Old World. Proc. Ent. Soc. Wash., 58(5):75.

RAU, P.

1915. The differentiation of cocoons of Pelopoeus caementarium and Chalybion caeruleum (Hymen.). Psyche, 22:62–63.

1928. Field studies in the behavior of the non-social wasps. Trans. Acad. Sci. St. Louis, 25(9):325–489.

SHAFER, G. D.

1949. The ways of a mud dauber, Stanford Univ. Press, Stanford, California. pp. 1–78, pls. 1–10.

TWO NEW SPECIES OF CATOCHINE GALL MIDGES, WITH A NEW KEY TO GENERA OF THE CATOCHINI

(Diptera: Cecidomyiidae)

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Gall midges belonging to the tribe Catochini are considered rare. Many of the known adults have been taken only in cold weather off snow. It is of considerable interest to learn that two species occur in the western United States, and both of these are described as new.

A female of *Anocha spinosa* (Felt), collected at Itasca Park, Minnesota, January 7, 1954, flying at -20° F. over snow, was forwarded to me by Dr. C. E. Mickel. A study of this and two other specimens recorded from Minnesota showed that the wing membrane possesses macrotrichia. Therefore, my key to genera of the tribe Catochini (1947) was erroneous, and a new key is presented. The genus *Catarete* Edwards is not included in this key because the antennal sensoria have not been described. The wing of *Catarete* is distinctive in that vein R_5 is very close to the costa and terminates before the apex of the wing.

KEY TO THE GENERA OF CATOCHINI

1. R_1 reaching costa before end of wing; flagellum without forked sensoria 2
– R_1 reaching costa at apex of wing; flagellum with forked sensoria 4
2. Flagellar segments each with a pair of budlike sensoria 3
– Flagellar segments with only sensory setae and rods ..... *Anocha* Pritchard
3. Medial fork with branches even; costa extending nearly to M_1 ..... *Neocatocha* Edwards
– Medial fork with branches very uneven, the upper branch sigmoid; costa ending just beyond R_5 ..... *Tritozyga* Loew
4. Wing membrane without macrotrichia or nearly so ..... *Eucatocha* Edwards
– Wing membrane with fairly dense macrotrichia ..... *Catocha* Haliday

Eucatocha betsyae Pritchard, new species

(Figure 1)

Eucatocha betsyae differs from *E. barberi* (Felt), the only